

Title 159 - STATE FIRE MARSHAL

Chapter 4 - DESIGN AND INSTALLATION STANDARDS FOR NEW UST SYSTEMS

001. All installations of new underground storage tank systems shall meet the specifications and requirements found in this chapter.

002. DESIGN STANDARDS

002.01. Tanks shall be designed and built in accordance with recognized good engineering standards for the material of construction being used, and shall be of steel, fiberglass reinforced plastic, or steel-fiberglass-reinforced plastic composite.

002.01A. Recognized good engineering standards include:

CATHODICALLY PROTECTED STEEL TANKS:

Steel Tank Institute "Specification for STI-P3 System of External Corrosion Protection of Underground Steel Storage Tanks";

Underwriters Laboratories Standard 1746, "Corrosion Protection Systems for Underground Storage Tanks";

Underwriters Laboratories of Canada CAN4-S603-M85, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids," and CAN4-G03.1-M85, "Standard for Galvanic Corrosion Protection Systems for Underground Tanks for Flammable and Combustible Liquids," and CAN4-S631-M84, "Isolating Bushings for Steel Underground Tanks Protected with Coatings and Galvanic Systems"; or

National Association of Corrosion Engineers Standard RP-02-85, "Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems," and Underwriters Laboratories Standard 58, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids."

FIBERGLASS-REINFORCED PLASTIC (FRP):

Underwriters Laboratories Standard 1316, "Standard for Glass- Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products";

Underwriter's Laboratories of Canada CAN4-S615-M83, "Standard for Reinforced Plastic Underground Tanks for Petroleum Products"; or

American Society of Testing and Materials Standard D4021-86, "Standard Specification for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks."

STEEL-FIBERGLASS-REINFORCED PLASTIC-COMPOSITE:

Underwriters Laboratories Standard 1746, "Corrosion Protection Systems for UST's"; or

Association for Composite Tanks ACT-100, "Specification for the Fabrication of FRP Clad USTs."

002.01B. The material of tank construction shall be compatible with the liquid to be stored. In case of doubt about the properties of the liquid to be stored, the supplier or producer of the liquid shall be consulted. Otherwise, the tank manufacturer should be consulted to assure compatibility.

003. CATHODIC PROTECTION

003.01. All steel tanks shall be cathodically protected in the following manner:

003.01A. The tank is coated with a suitable dielectric material;

003.01B. Field-installed cathodic protection systems are designed by a corrosion expert;

003.01C. Impressed current systems are designed to allow determination of current operating status as required in §002.03 of Chapter 6; and

003.01D. Cathodic protection systems are operated and maintained in accordance with §002 of Chapter 6.

004. NEW TANK INSTALLATION

004.01. The installation of a new tank shall be carried out in accordance with the manufacturer's recommendations and accepted engineering practices, such as:

Petroleum Equipment Institute/RP100

American Petroleum Institute Publication 1615

004.02. Owners shall obtain an installation permit for all new tank and new piping installations (Chapter 2). New tanks shall be installed only by certified installers pursuant to the requirements of Chapter 3.

004.03. All new tanks, their welds, seams and connecting fittings must be tested prior to installation for tightness using standard engineering practices.

004.03A. Preinstallation tank testing shall be in accordance with Petroleum Equipment Institute/RP 100 or the tank manufacturer's installation instructions.

004.03B. All new single-wall tanks will be tested with three (3) to five (5) psig of air pressure. Gauges must have a scale that will permit detection of small changes in pressure. A gauge with a maximum limit of 10 to 15 psig is required. The test will include the application of a soap solution over the entire surface of the tank and its fittings, followed by careful inspection for bubbles. The soap solution should be applied uniformly with a mop or spray.

004.03C. All new double-walled tanks will be tested with three (3) to five (5) psig of air pressure. Gauges must have a scale that will permit a detection of small changes in pressure. A gauge with a maximum limit of 10 to 15 psig is required. The test will include pressurizing the inner tank to five (5) psig then sealing the inner tank disconnecting the external air supply, and monitoring the pressure for one hour. The interstice shall be tested using the air from the inner tank. A second gauge must be used in monitoring the interstice. The entire surface of the tank shall be soaped followed by a careful inspection for bubbles. The soap solution should be applied uniformly with a mop or spray.

004.03D. All defects or scratches in the tanks coating shall be repaired in a manner approved by the manufacturer.

004.04. Backfill material shall be pea gravel, crushed rock, or clean sand

free of cinders, stones, and any other foreign material. Tank installation instructions may require specific aggregate sized crushed rock or gravel. Instructions may also specify mechanical compaction or layered placement of bedding and backfill. The installation instructions provided by the manufacturer must always be consulted prior to installation.

004.05. Steel underground tanks shall be covered with a minimum of two (2) feet (0.60 m) of backfill, or shall be covered with not less than one (1) foot (0.30 m) of backfill, on top of which shall be placed a slab of reinforced concrete not less than four (4) inches (10 cm) thick. When they are, or are likely to be, subjected to traffic they shall be protected against damage from vehicles passing over them by at least three (3) feet (0.90 m) of backfill, or 18 inches (45.7 cm) of well-tamped backfill plus either six (6) inches (15 cm) of reinforced concrete or eight (8) inches (20 cm) of asphaltic concrete. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least one (1) foot (0.30 m) horizontally beyond the rim of the excavation in all directions.

004.06. Anchoring of tanks shall be required whenever there is a possibility of tank flotation. When anchoring tanks equipped with cathodic protection the straps must be electrically isolated from the tanks. Straps must be provided or approved by the tank manufacturer. Anchoring of all tanks shall be performed in accordance with the tank manufacturer's specifications or accepted engineering practices. Prevention of tank flotation through increased overburden shall be allowed only if approved by the tank manufacturer.

004.07. Owners and operators must use the following spill and overflow prevention equipment:

004.07A. Spill prevention equipment that will prevent release of product to the environment when the transfer hose is detached from the fill pipe. If a spill catchment basin is used to meet this requirement it must be capable of holding three gallons of product; and

004.07B. Overflow prevention equipment that will:

004.07B1. Automatically shut off flow into the tank when the tank is no more than 95 percent full; or

004.07B2. Alert the transfer operator when the tank is no more than 90 percent full by restricting the flow into the tank or triggering a high-level alarm; or

004.07B3. Restrict flow 30 minutes prior to overfilling, alert

the operator with a high level alarm one minute before overfilling, or automatically shut off flow into the tank so that none of the fittings located on top of the tank are exposed to product due to overfilling.

004.08. Owners and operators are not required to use the spill and overfill prevention equipment specified in §004.07A if:

004.08A. Alternative equipment is used that is determined by the State Fire Marshal to be no less protective of human health and the environment as the equipment specified in §004.07A and 004.07B above; or

004.08B. The UST system is filled by transfers of no more than 25 gallons at a time.

004.09. All new UST systems must be equipped with one method of release detection as outlined in Chapter 7.

004.10. All new underground product pipes must be made of fiberglass reinforced plastic or cathodically protected, coated, iron or steel and must be designed, fabricated and installed in accordance with recognized standards such as:

- NACE Standard RP-01-69
- Underwriters Laboratories Subject 971
- American Petroleum Institute Publication 1632
- PEI RP 100

NOTE: Galvanized piping shall not be used for product lines.

004.10A. Before underground piping is installed, the trench shall receive as a minimum a six (6) inch deep bed of well compacted, coarse-grained homogeneous material such as clean sand or pea gravel. All trenches shall be wide enough to permit at least six (6) inches of coarse-grained homogeneous backfill material around all lines.

004.10A1. Vent and fill lines must be coated but need not be cathodically protected. Product lines must be cathodically protected unless made of fiberglass.

004.10B. All product lines shall slope a minimum of 1/8 of inch per foot towards the tank and be installed in a single trench between the tank area and pump island. All vent lines shall slope a minimum of 1/8 inch per foot towards the tank and be installed in a

single trench.

004.10C. All unions and fittings shall be a minimum of 250 lb. All joints, damaged pipe coating or unprotected threads shall be wrapped or coated with a material approved by the manufacturer.

004.10D. All new product lines shall be pneumatically tested for tightness with air pressure. All joints, seams and connections shall be soaped to detect leakage. For non-metallic piping the entire surface as well as joints and connections shall be soaped. The test shall be maintained for a minimum of one (1) hour, and all soaped areas shall be visually inspected for bubbles or any other indication of a leak. Piping shall be tested at not less than 50 psig at the highest point of the system. Any loss of pressure or appearance of bubbles shall constitute failure of the test.

004.10E. All product supply lines which are used in conjunction with remote pumping systems shall be installed with a product-line leak detector in accordance with the manufacturer's installation instructions. Leak detectors shall be checked and tested at least annually according to the manufacturer's specification to insure proper installation and operation. Records of these tests must be kept on site.

004.10F. All conventional suction systems shall have no more than one check valve per pump.

004.10G. Field-installed cathodic protection systems shall be designed by a corrosion expert.

004.11. Alternate methods of piping construction and corrosion protection used to meet the requirements of this chapter may be approved by the SFM and shall be designed to prevent the release or threatened release of any stored regulated substance in a manner that is no less protective of human health and the environment than the requirements in 004.10 above.

004.12. When any portion of an UST system is installed within 500 feet of a public water supply, that portion shall be equipped with secondary containment. Secondary containment shall mean either a single-walled tank and piping system with an excavation liner or a double-walled tank and piping system as specified in 004.13B below.

004.12A. Safe suction piping is not required to meet the requirements of this section.

004.13. Underground storage tank systems storing hazardous substances as defined in §003.21 in Chapter 1 shall meet the following requirements:

004.13A. Release detection at existing UST systems must meet the requirements for petroleum UST systems in §002 of Chapter 7. All existing hazardous substance UST systems must meet the release detection requirements for new systems in subsection 004.13B below by December 22, 1998.

004.13B. Release detection at new hazardous substance UST systems must meet the following requirements:

004.13B1. Secondary containment systems must be designed, constructed and installed to:

004.13B1(a). Contain regulated substances released from the tank system until they are detected and removed;

004.13B1(b). Prevent the release of regulated substances to the environment at any time during the operational life of the UST system; and

004.13B1(c). Be checked for evidence of a release at least every 30 days.

004.13B2. Double-walled tanks must be designed, constructed, and installed to:

004.13B2(a). Contain a release from any portion of the inner tank within the outer wall; and

004.13B2(b). Detect the failure of the inner wall.

004.13B3. External liners (including vaults) must be designed, constructed, and installed to:

004.13B3(a). Contain 100 percent of the capacity of the largest tank within its boundary;

004.13B3(b). Prevent the interference of precipitation or ground-water intrusion with the ability to contain or detect a release of regulated substances; and

004.13B3(c). Surround the tank completely (i.e., it is capable of preventing lateral as well as vertical migration of regulated substances).

004.13B4. Underground piping must be equipped with secondary containment that satisfies the requirements of §004.13B1 above (e.g., trench liners, jacketing of double-walled pipe). In addition, underground piping that conveys regulated substances under pressure must be equipped with an automatic line leak detector in accordance with §005.01 of Chapter 7.

004.13B5. Other methods of release detection may be used if owners and operators:

004.13B5(a). Demonstrate to the State Fire Marshal that an alternate method can detect a release of the stored substance as effectively as any of the methods allowed in §§004.02-004.08 of Chapter 7 can detect a release of petroleum;

004.13B5(b). Provide information to the State Fire Marshal on effective corrective action technologies, health risks, and chemical and physical properties of the stored substance, and the characteristics of the UST site; and,

004.13B5(c). Obtain approval from the State Fire Marshal to use the alternate release detection method before the installation and operation of the new UST system.

004.14. All used steel and fiberglass reinforced plastic tanks shall require the manufacturer's certification for re-installation. Installations shall follow all procedures set out in §004 of this chapter.

Legal Citation: Title 159, Chapter 4
Nebraska State Fire Marshal